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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/538,457
Filing Date: June 10, 2005
Appellant(s): KNUDSEN, CARL

Mark A. Wilson
Registration No. 43,994
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 30, 20010 appealing from the Office action mailed December 2, 2009.

(1) Real Party in Interest

The examiner has no comment on the statement, or lack of statement, identifying by name the real party in interest in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The following is a list of claims that are rejected and pending in the application:

1, and 3-20.

(4) Status of Amendments After Final

The examiner has no comment on the appellant's statement of the status of amendments after final rejection contained in the brief.

(**5) Summary of Claimed Subject Matter**

The examiner has no comment on the summary of claimed subject matter contained in the brief.

(6) Grounds of Rejection to be Reviewed on Appeal

The examiner has no comment on the appellant's statement of the grounds of rejection to be reviewed on appeal. Every ground of rejection set forth in the Office action from which the appeal is taken (as modified by any advisory actions) is being maintained by the examiner except for the grounds of rejection (if any) listed under the

subheading “WITHDRAWN REJECTIONS.” New grounds of rejection (if any) are provided under the subheading “NEW GROUNDS OF REJECTION.”

(7) Claims Appendix

The examiner has no comment on the copy of the appealed claims contained in the Appendix to the appellant’s brief.

(8) Evidence Relied Upon

7,005,733	KOMMERLING	2-2006
5,129,629	DOUBLE	7-1992
JP 7209019	FUJIKI	08-1995
JP 3084959	SANO	4-1991

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

. Claims 1-2, 8-12,15-17, and 19-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Kommerling et al. (US 7,005,733).

Regarding Claim 1, 15-16, and 19-20:

Kommerling discloses an integrated circuit device (“Integrated Circuit of Microchip,” See fig. 1b ref. no. 195 and col. 6 lines 24-30) having a plurality of magnetically-responsive circuit nodes ("Hall Effect Sensors” See figs. 1a, 1b, 5a, and 5b ref. no. 150 and “Another is to allocate to each sensor a one bit value indicating whether it’s reading exceeds a threshold (derived initially based on the statistics of the readings) or not.” See col. 9 lines 46-48), a package adapted to inhibit access to the integrated

circuit device ("The encapsulation 50 surrounds the device substrate 350 on both sides and comprises an epoxy resin matrix." See col. 10 lines 44-52) and including a plurality of magnetized particles therein ("Within the matrix, a plurality of particles 360 are provided, of various sizes, shapes and/or magnetic permeabilities." See col. 10 lines 44-52), the magnetically-responsive circuit nodes magnetically responding to the plurality of magnetized particles such that a change in magnetic field collectively provided by the magnetized particles renders a change in a magnetic state of at least one of the magnetically-responsive circuit nodes, and detects tampering in response to a change in the magnetic field ("Thus, magnetic properties measured by the sensors 150 will generally be different at each of the sensors, as described above. Further, any attempt to remove the outer shield 370 will itself change the distribution of the magnetic field and therefore make it impossible to read the key." See col. 11 lines 4-6).

Regarding Claim 2:

Kommerling discloses the integrated circuit device includes a detection circuit adapted to detect the magnetic state of the magnetically-responsive circuit nodes ("Sense Amplifier" See fig. 3 ref. no. 300 and col. 9 lines 20-32) and in response to a change in the magnetic state, to detect that the package has been tampered with ("In the event of tampering with the encapsulation 50, the encapsulation properties 170 are altered, leading to alterations in the detected properties140 and hence the cryptographic input (key) 160." See col. 6 lines 17-23).

Regarding Claims 8-12:

Kommerling discloses the areas of the encapsulation 50 sensed by each sensor 150 may overlap or abut each other; the key criterion in order to prevent holes being drilled through the encapsulation to the circuit below, is that the areas sensed by the sensors leave no separation larger than the width of the smallest hole which can be drilled (for example using focused ion beam technology.

Regarding Claim 17:

Kommerling discloses a tamper-response circuit ("Linear Feedback Shift Register" See fig. 3 ref. no. 330) adapted to alter a characteristic of the integrated circuit chip in response to the tamper protection circuit detecting the magnetic response of the at least one magnetically-responsive elements ("The successive digital sensor readings are then loaded into a linear feedback shift register (LFSR) 330 which combines them according to some scrambling function and produces a key 340 of the requested length (e.g. 64 bits) using all sensor readings, in some logical combination." See col. 9 lines 33-37).

Claims 1-7 and 14 are rejected under 35 U.S.C. 103(a) as being obvious over Sano (JP 3084959 A) in view of Kommerling et al. (US 7,005,733).

Regarding Claim 1 and 14:

Sano discloses an integrated circuit device ("Package" See fig. 2 ref. no. 4) having a plurality of magnetically-responsive circuit nodes ("Hall Element" See fig. 1 ref. no. 1), a magnet detachably connected to the integrated circuit device chip ("A magnet 5 is installed at the outside of the package so as to be freely detachable." See fig. 2 ref.

no. 5 and abstract), the magnetically-responsive circuit nodes magnetically responding to the magnet such that a change in magnetic field provided by the magnet renders a change in a magnetic state of at least one of the magnetically-responsive circuit nodes (A hall element 1 detects a magnetic field from the outside of a package of an integrated circuit." See abstract).

Sano does not disclose a plurality of magnetically-responsive circuit nodes and a package adapted to inhibit access to the integrated circuit device and including a plurality of magnetized particles therein, and detecting tampering when a change in magnetic field is detected.

Kommerling discloses an integrated circuit having a hall effect sensors disposed covering all circuit-containing areas (See col. 9 lines 54-56 and col. 10 lines 2-11) and an encapsulation surrounding a device substrate on both sides and comprises an epoxy resin matrix. Within the matrix are a plurality of particles of various sizes, shapes and/or magnetic permabilities. A pair of plate shaped permanent magnets are provided above and below the encapsulation layers and bonded thereto by the epoxy resin. (See col. 10 lines 44-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the detachable magnet disclosed by Sano with the epoxy resin matrix and permanent magnets and includes hall effect sensors disposed covering all circuit-containing areas such as those taught by Kommerling in order to protect the integrated circuit device from tampering (See Kommerling col. 2 lines 17-20 and col. 10 lines 2-11).

Regarding Claim 2:

The above stated combination of Sano and Kommerling discloses the integrated circuit arrangement includes a detection circuit adapted to detect the magnetic state of the magnetically-responsive circuit node (“The mode changeover circuit 2 instructs a mode changeover by a magnetic-field detection output from the Hall element 1.” See Sano fig. 1 ref. no. 2 and abstract) and in response to a change in the magnetic state to detect that the package has been tampered with (“The mode changeover circuit 2 is connected to a circuit main body 3 and changes its operating mode by an input from the mode changeover circuit 2.” See Sano abstract).

Regarding Claim 3:

The above stated combination of Sano and Kommerling discloses the detection circuit includes a comparison circuit adapted to compare the detected a magnetic state with a reference and to detect tampering with the package in response to the detected magnetic state being different than the reference state [The examiner respectfully points out that the mode changeover circuit inherently includes a comparison circuit with a reference voltage value. The hall element will output a first voltage to the mode changeover circuit when the magnet is installed at the outside of the package and output a second voltage to the mode changeover circuit when the magnet is removed from the outside of the package. The mode changeover circuit will receive the voltage output from the hall element and in order to determine if the magnet was removed must perform a comparison of the received voltage will a reference voltage value. For example, an integrated circuit having a default high mode changeover circuit using

transistor transistor logic a comparison will be performed to determine if the received voltage between 2.2v and 5v for a high (magnet installed) and 0v to 0.8v for low (magnet removed).]

Regarding Claims 4 and 5:

The above stated combination of Sano and Kommerling discloses an integrated circuit device having a the epoxy resin matrix and permanent magnets package and a mode changeover circuit that senses changes in the epoxy resin and permanent magnets package to detect tempering with the package.

The above stated combination of Sano and Kommerling does not disclose one-time programmable ROM adapted to store data representative of an untampered magnetic state of the magnetically-responsive node.

Kommerling discloses an integrated circuit device having an initialization circuit with a ROM storing a loader program that reader the detected property signal (See col. 6 lines 31-51)

It would have been obvious to one of ordinary skill in the art at the time of the invention to include in the above stated combination of Sano and Kommerling a initialization circuit with a ROM such as that taught by Kommerling in order to allow the manufacturer to set the voltage levels for determining when the package has been tampered with.

Regarding Claim 6:

The above stated combination of Sano and Kommerling discloses an integrated circuit device having a the epoxy resin matrix and permanent magnets package and a

mode changeover circuit that senses changes in the epoxy resin and permanent magnets package to detect tempering with the package.

The above stated combination of Sano and Kommerling does not disclose the integrated circuit device is adapted to alter data stored in the integrated circuit in response to the comparison circuit detecting tampering with the package.

Kommerling discloses an integrated chip that in the event of tampering with the encapsulation, the encapsulation properties are altered leading to alteration in the detected properties and hence the cryptographic key (See col. 6 lines 17-23).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the above stated combination of Sano and Kommerling to include altering data stored in the integrated circuit such as that taught by Kommerling in order to render to the device inoperative after the device has been tampered with (See Kommerling col. 6 lines 17-23).

Regarding Claim 7:

The above stated combination of Sano and Kommerling discloses the integrated circuit device is adapted to set a tamper-detection flag in response to the comparison circuit detecting tampering ("The mode changeover circuit 2 is connected to a circuit main body 3 and changes its operating mode by an input from the mode changeover circuit 2." See Sano abstract).

Claim 13 is rejected under 35 U.S.C. 103(a) as being obvious over Kommerling et al. (US 7,005,733) in view of Fujiki (JP 7209019 A).

Kommerling discloses the above stated an integrated circuit having a plurality of Hall Effect sensors and an epoxy resin and permanent magnets package to detect tempering with the package.

Kommerling does not disclose each magnetically-responsive circuit node includes a circuit element that resistively responds to a magnetic field generated by the magnetized particles.

Fujiki discloses a magnetic encoder having a magnetic resistance effect element (See fig. 1 ref. no. 1 and abstract) and an integrated circuit to treat signals output from the magnetic resistance effect element (See fig. 1 ref. no. 2 and abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the Hall Effect sensors disclosed by Kommerling with the magnetic resistance effect element such as the taught by Fujiki in order to reduce the size of the magnetic signal detection processing part (See Fujiki abstract).

Claims 17-18 are rejected under 35 U.S.C. 103(a) as being obvious over Kommerling et al. (US 7,005,733) in view of Double et al. (US 5,129,629).

Kommerling discloses the above stated an integrated circuit having a plurality of Hall Effect sensors and an epoxy resin and permanent magnets package to detect tempering with the package.

Kommerling does not disclose a tamper-response circuit is adapted to erase memory from the integrated circuit chip in response to the tamper-protection circuit detecting the magnetic response of the at least one magnetically-responsive elements.

Double discloses an encryption/decryption circuit for detecting and prevent unauthorized interrogation that determines if any one of the sensor inputs changes from high to low, as a result of certain predetermined conditions indicating an attack the NAND gate will turn on and the data from memory will be quickly erased (See fig. 2, col. 3 lines 51-68 and col. 4 lines 1-15).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Kommerling to include erasing data from memory in response to an unauthorized interrogation such as that taught by Double in order to protect the contents of the computer memory from being unlawfully or unauthorizedly extracted and read (See Double col. 1 lines 16-18).

(10) Response to Argument

The Appellant argues:

That Kommerling does not teach detecting tampering.

The Examiner contends that Kommerling does teach detecting tampering. Kommerling states “any attempt to remove the outer shield 370 will itself change the distribution of the magnetic field and therefore make it impossible to read the key” (Kommerling: column 11, lines 3-10). This attempt to remove step is interpreted as tampering, and the result of the detection is blocking any attempt to read the key. Without the step of detecting the tampering, the circuit of Kommerling would have no indication of when to block access to the key. Therefore, the Examiner contends that Kommerling does disclose detecting tampering.

The Appellant further argues:

That even if the Cited Prior Art (CPA) teaches tampering, it is not in response to a change in the magnetic properties of the encapsulation, but in response to a request by the CPU to access the memory.

The Examiner contends that Kommerling does teach detecting tampering by observing a change in the magnetic properties of the encapsulation. Kommerling discloses that states “any attempt to remove the outer shield 370 will itself change the distribution of the magnetic field and therefore make it impossible to read the key” (Kommerling: column 11, lines 3-10). Therefore, Kommerling explicitly states that this detection of tampering is due to a change in the distribution of the magnetic field, and therefore, the detecting is in response to a chance of the magnetic properties of the encapsulation (outer shield).

The Appellant further argues:

That Kommerling does not teach a tamper-response circuit to alter a characteristic of the integrated circuit chip in response to the tamper-protection circuit detecting the magnetic response of at least one magnetically-responsive element.

The Examiner contends that Kommerling does teach this altering of a characteristic of the integrated circuit. The Examiner contends that Kommerling teaches “any attempt to remove the outer shield 370 will itself change the distribution of the magnetic field and therefore make it impossible to read the key” (Kommerling: column 11, lines 3-10). Therefore, Kommerling teaches that access to the key is

blocked because a characteristic of the integrated circuit (changing the distribution of the magnetic field) makes it impossible to read the key (Kommerling: column 11, lines 3-10).

The Appellant further argues:

That the combination of Sano and Kommerling do not teach detecting that the package has been tampered with in response to a change in the magnetic state.

The Examiner contends that Kommerling does teach detecting tampering by observing a change in the magnetic properties of the encapsulation. Kommerling discloses that states “any attempt to remove the outer shield 370 will itself change the distribution of the magnetic field and therefore make it impossible to read the key” (Kommerling: column 11, lines 3-10). Therefore, Kommerling explicitly states that this detection of tampering is due to a change in the distribution of the magnetic field, and therefore, the detecting is in response to a chance of the magnetic properties of the encapsulation (outer shield).

The Appellant further argues:

That the proposed combination of the references is improper.

The Examiner contends that the combination of the references is proper, and that Sano does not teach away, and that the proposed combination would not destroy the prior art's original purpose. Sano is directed to detecting a magnetic field from the outside of the package (see Abstract), and Kommerling is also directed to using a

magnetic field (which it uses to protect the key). Therefore, the fact that Kommerling and Sano use the magnetic fields for different purposes is not vital to making it obvious to combine. Sano uses a change in the magnetic field to change the operation (see Abstract) which could comprise changing an operation in response to tampering. Therefore, the combination is deemed to be appropriate.

The Appellant finally argues:

That the Cited Prior Art (CPA) does not teach comparing the detected magnetic state with a reference state and to detect tampering with the package in response to the detected magnetic state being different than the reference state.

, The Examiner contends that this comparing step is performed by the combination of Sano and Kommerling. The Examiner respectfully points out that the mode changeover circuit includes a comparison circuit with a reference voltage value ("The mode changeover circuit 2 instructs a mode changeover by a magnetic-field detection output from the Hall element 1." See Sano fig. 1 ref. no. 2 and abstract). The hall element will output a first voltage to the mode changeover circuit when the magnet is installed at the outside of the package and output a second voltage to the mode changeover circuit when the magnet is removed from the outside of the package ("The mode changeover circuit 2 instructs a mode changeover by a magnetic-field detection output from the Hall element 1." See Sano fig. 1 ref. no. 2 and abstract). The mode changeover circuit will receive the voltage output from the hall element and in order to determine if the magnet was removed must perform a comparison of the received

voltage will a reference voltage value (“The mode changeover circuit 2 is connected to a circuit main body 3 and changes its operating mode by an input from the mode changeover circuit 2.” See Sano abstract). For example, an integrated circuit having a default high mode changeover circuit using transistor logic a comparison will be performed to determine if the received voltage between 2.2v and 5v for a high (magnet installed) and 0v to 0.8v for low (magnet removed). Therefore, the Examiner contends that this comparing the detected magnetic state to a reference state is performed by the combination of Sano and Kommerling.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

(12) Conclusion

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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